Patent claims

1 (Currently amended). A method selected from the group consisting of:

i) a method for the in vitro or in vivo degradation of amorphous or crystalline silicone dioxide (condensation products of the silicic acid, silicates), silicones and other silicon (IV)- or metal (IV)-compounds as well as of mixed polymers of these compounds, wherein a polypeptide or a metal complex of a polypeptide is used for the degradation, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1;

ii) a method for the synthesis of amorphous silicone dioxide (condensation products of the silicic acid, silicates), silicones and other silicon (IV)- or metal (IV)-compounds as well as of mixed polymers of these compounds, wherein a polypeptide or a metal complex of a polypeptide is used for the synthesis, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1; and

iii) a method for the modification of a silicic acid or silicon(IV)- or metal (IV)-compound-containing structure or surface, wherein a polypeptide or a metal complex of a polypeptide is used for the modification, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1.

2 (Currently amended). The method for the synthesis of amorphous silicone dioxide (condensation products of the silicic acid, silicates), silicones and other silicon (IV)- or metal (IV)-compounds as well as of mixed polymers of these compounds, according to claim 1, wherein a polypeptide or a metal complex of a polypeptide is used for the synthesis, characterized in that the polypeptide comprises an animal, bacterial, plant or

fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1.

3 (Currently amended). The method according to claim 2, characterized in that a compound selected from the group consisting of silicic acids, monoalkoxysilantrioles, dialkoxysilandioles, trialkoxysilanoles, tetraalkoxysilanes, alkyl- or aryl-silantrioles, alkyl- or aryl-monoalkoxysilandioles, alkyl- or aryl-dialkoxysilanoles, alkyl- or aryl-trialkoxysilanes and other metal(IV)- compounds is used as a reactant (substrates) for the synthesis.

4 (Currently amended). The method according to claim 3, wherein mixed polymers having a defined composition are produced by using defined mixtures of the compounds.

5 (Currently amended). The method according to claim 2, wherein the formation of defined two- and three-dimensional structures occurs by the polypeptide or a metal complex of the polypeptide or the binding of the polypeptide or a metal complex of the polypeptide to other molecules or the surfaces of glass, metals, metal oxides, plastics, biopolymers or other materials as a template.

6 (Currently amended). The method for the modification of a silicic acid or silicon(IV)- or metal (IV)-compound-containing structure or surface, according to claim 1, wherein a polypeptide or a metal complex of a polypeptide is used for the modification, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1.

7 (Currently amended). The method according to claim 6, wherein the silicic acid-containing structure or surface is present in form of a precious stone or semi-precious stone.

8 (Currently amended). The method according to claim 6, wherein the modification comprises a smoothing, an etching or the production of burrows of the silicic acid or silicon(IV)- or

metal(IV)-compound-containing structure or surface by the polypeptide or a metal complex of the polypeptide.

9 (Currently amended). A chemical compound or silicic acid-containing structure or surface, obtained according to a method selected from the group consisting of:

i) a method for the in vitro or in vivo degradation of amorphous or crystalline silicone dioxide (condensation products of the silicic acid, silicates), silicones and other silicon (IV)- or metal (IV)-compounds as well as of mixed polymers of these compounds, wherein a polypeptide or a metal complex of a polypeptide is used for the degradation, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1;

ii) a method for the synthesis of amorphous silicone dioxide (condensation products of the silicic acid, silicates), silicones and other silicon (IV)- or metal (IV)-compounds as well as of mixed polymers of these compounds, wherein a polypeptide or a metal complex of a polypeptide is used for the synthesis, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1; and

iii) a method for the modification of a silicic acid or silicon(IV)- or metal (IV)-compound-containing structure or surface, wherein a polypeptide or a metal complex of a polypeptide is used for the modification, characterized in that the polypeptide comprises an animal, bacterial, plant or fungal carbonic anhydrase domain that exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1.

10 (Currently amended). The silicic acid-containing structure or surface according to claim 9 in the form of a precious stone or semi-precious stone.

11 (Currently amended). A polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid

sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, a metal complex of the polypeptide, or a part thereof.

12 (Currently amended). A nucleic acid characterized in that it encodes a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, or a part thereof.

13 (Currently amended). The nucleic acid according to claim 12, characterized in that it is present in the form of a DNA, cDNA, RNA or mixtures thereof.

14 (Currently amended). The nucleic acid according to claim 12, characterized in that the sequence of the nucleic acid has at least one intron and/or a polyA-sequence.

15 (Currently amended). The nucleic acid according to claim 12, in the form of its complementary "antisense"-sequence.

16 (Currently amended). The nucleic acid according to claim 12 in the form of a (a) fusion protein- (chimeric protein) construct, (b) construct having a separate protein-expression (protease-cleavage site) or (c) construct having a separate protein-expression (cassette-expression).

17 (Currently amended). The nucleic acid according to claim 12, characterized in that the nucleic acid has been synthetically produced.

18 (Currently amended). A composition of matter selected from the group consisting of:

i) a vector, in the form of a plasmid, shuttle vector, phagemid, cosmid, expression vector, retroviral vector, adenoviral vector or particle, nanoparticle or liposome, comprising a nucleic acid characterized in that the nucleic acid encodes a

polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, or a part thereof;

ii) a vector, in the form of a nanoparticle or liposome, comprising a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO: 1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, a metal complex of the polypeptide, or a part thereof; and

iii) a host cell, transfected with a vector or infected or transduced with a particle according to parts i) and ii) above.

19 – 20 (Cancelled).

21 (Currently amended). The host cell according to claim 18, characterized in that it expresses a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, a metal complex of the polypeptide, or a part thereof.

22 (Currently amended). The polypeptide according to claim 11, characterized in that the polypeptide has been synthetically produced.

23 (Currently amended). The polypeptide according to claim 11, characterized in that the polypeptide or the metal complex of the polypeptide is present in a prokaryotic or eukaryotic cell extract or lysate.

24 (Currently amended). The polypeptide according to claim 23, characterized in that the polypeptide or the metal complex of the polypeptide is present being purified essentially free of other proteins.

25 (Currently amended). A method for identifying inhibitors or activators of a polypeptide of a silicase from Suberites domuncula according to SEQ ID No. 1 or a polypeptide being homologous thereto that in the amino acid sequence of the carbonic anhydrase domain has at least 25% sequence similarity to the sequence shown in SEQ ID No. 1, wherein a) a polypeptide of a silicase from Suberites domuncula according to SEQ ID No. 1 or a polypeptide being homologous thereto that in the amino acid sequence of the carbonic anhydrase domain has at least 25% sequence similarity to the sequence shown in SEQ ID No. 1 is provided, b) the polypeptide from step a) is contacted with a potential inhibitor or activator, and c) the ability of the polypeptide is measured to degrade or synthesize silicate or silicones.

26 (Currently amended). The method according to claim 25, wherein the polypeptide of a silicase from Suberites domuncula according to SEQ ID No. 1 or a polypeptide being homologous thereto that in the amino acid sequence of the carbonic anhydrase domain has at least 25% sequence similarity to the sequence shown in SEQ ID No. 1 is provided in vivo, in a cellular extract or lysate or in purified form.

27 (Currently amended). A method for producing a pharmaceutical composition, comprising a) identifying an inhibitor or activator according to claim 25 and b) mixing of the identified inhibitor or activator with a pharmaceutically acceptable carrier or excipient.

28 (Currently amended). A method for the prevention or therapy of silicosis, wherein said method comprises administering a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, a metal complex of the polypeptide, or a part there or a nucleic acid characterized in that it encodes a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, or a part thereof.

29 (Currently amended). The method, according to claim 28, wherein the prevention and therapy of silicosis occurs by dissolving of quartz crystals

30 (Currently amended). A use of

a) a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, a metal complex of the polypeptide, or a part thereof; or

b) a nucleic acid characterized in that it encodes a polypeptide of a silicase from Suberites domuncula according to SEQ ID NO:1 or a polypeptide being homologous thereto, which in the amino acid sequence of the carbonic anhydrase domain exhibits a sequence similarity of at least 25% to the sequence shown in SEQ ID No. 1, or a part thereof;

wherein said use is selected from the group consisting of:

i) use of said polypeptide or nucleic acid for the resorption or for modulating the resorbability of silicones and silicone implants; and

ii) use of said nucleic acid for transfecting cells for the resorption or for modulating the resorbability of silicones and silicone implants.

31 (Cancelled).